In the claims:

Please amend the claims as follows:

1. (Canceled)

2-40. (Withdrawn)

41. (Previously Amended) A device, comprising:

a plurality of quantum well elements, each with a well layer having a well bottom, a well top, and bound energy states within said well, and first and second barrier layers surrounding said well layer, said well layers being formed of materials that cause a bound energy state to be resonant with said well top, at a level that allows an electron in said well to escape to an electron continuum area of higher energy state electrons, without tunneling through material forming said barrier layers.

42. (Canceled)

43. (Previously Added) A device as in claim 41, further comprising an element that adjusts a direction of input radiation, relative to said quantum well elements.

44. (Previously Added) A device as in claim 43, further comprising electrical contact layers, including a first electrical contact layer on a first side of said quantum well elements, and a second electrical contact layer on a second side of said quantum well elements.

45. (Previously Added) A device as in claim 44, wherein said element that adjusts direction of input radiation is formed as part of one of said electrical contact layers.

46. (Previously Added) A device as in claim 44, further comprising a plurality of image sensors, arranged in an array.

47. (Previously Added) A device as in claim 46, wherein said plurality of quantum well elements are arranged into a plurality of quantum well stacks, each quantum well stack including a plurality of periods, each period comprising a well layer and first and second barrier layers, and each quantum well stacks associated with one of said image sensors.

48. (Previously Added) A device as in claim 47, wherein each of said quantum well structures are spatially aligned with one of said image sensors.

49. (Previously Added) A device as in claim 44, further comprising a plurality of bumps, connecting between said quantum well stacks and said image sensors.

50. (Previously Added) A device as in claim 46, wherein said image sensors are CMOS image sensors.

51. (Previously Added) A device as in claim 41, further comprising a plurality of image sensors, arranged in an array, and associated with said plurality of quantum well elements.

52. (Previously Added) A device as in claim 51, wherein said plurality of quantum well elements are arranged into a plurality of quantum well stacks, and each said quantum well stack including a plurality of periods, and each of said periods comprising a well layer and first and second barrier layers, each of said quantum well stacks associated with one of said image sensors.

53. (Previously Added) A device as in claim 52, wherein said quantum well stacks are respectively spatially aligned with said array of image sensors.

54. (Previously Added) A device as in claim 48, wherein each of said image sensors has a peak sensitivity in the infrared region.

55. (Previously Added) A device as in claim 54, wherein said well layer is formed of GaAs.

56. (Previously Added) A semiconductor, comprising:

a plurality of semiconductor image sensors, arranged on a substrate in an array;

a plurality of quantum well stacks, respectively associated with said plurality of semiconductor image sensors, each said stack comprising a plurality of quantum well structures, each said quantum well structure having a barrier layer of a first semiconductor material, and a well layer of a second semiconductor material, said first and second semiconductor materials defining a band gap there between, each well layer of each quantum well structure coupled between two of said barrier layers, and each well layer having a well bottom and a well top, and each well supporting an unexcited energy state within said well, and a bound excited energy state for photo carriers, each of said well layers being selected such that the bound excited energy state is substantially resonant with a top portion of the well.

57. (Previously Added) A semiconductor as in claim 56, wherein said semiconductor image sensors have peak sensitivity in the infrared range.

58. (Previously Added) A semiconductor as in claim 56, further comprising a radiation direction adjusting element that adjusts a direction of input radiation relative to said quantum well stacks.

59. (Previously Added) A semiconductor as in claim 58, wherein said radiation directing adjusting element includes a plurality of random reflectors.

60. (Previously Added) A semiconductor as in claim 59, wherein said random reflectors are formed of gold.

61. (Previously Added) A semiconductor as in claim 56, further comprising a plurality of electrical contacts, associated with said semiconductor.

62. (Previously Added) A semiconductor as in claim 61, further comprising a plurality of random reflectors, operating to adjust a direction of input radiation.

63. (Previously Added) A semiconductor as in claim 61, wherein said random reflectors are formed on one of said electrical contacts.

64. (Previously Added) A semiconductor as in claim 56, wherein there are 50 of said quantum well structures in each of said quantum well stacks.

65. (Previously Added) A semiconductor as in claim 57, wherein said well layers are formed of GaAs, and said barrier layers are formed of $Al_xGa_{1-x}As$.

66. (Previously Added) A semiconductor as in claim 54, wherein said image sensors have a peak reception at 8.5 microns.

67. (Previously Added) A semiconductor as in claim 56, wherein said quantum well is formed of $Al_yGa_{1-y}As$, and said barrier layer is formed of $Al_zGa_{1-z}As$.

68-70. (Withdrawn)

71. (Previously Amended) A semiconductor, comprising:

a plurality of semiconductor image sensors, arranged on a substrate in an array;

a plurality of quantum well stacks, respectively associated with said plurality of semiconductor image sensors, each said stack comprising a plurality of quantum well structures, each said quantum well structure having a barrier layer of a first semiconductor material that is greater than 300 microns in width, and a well layer of a second semiconductor material, said first and second semiconductor materials defining a band gap therebetween, each well layer of each quantum well structure coupled between two of said barrier layers, and each well layer having a well bottom and a well top, wherein each well supporting an unexcited energy state within said well, and a bound excited energy state for photo carriers, each of said well layers being selected such that the bound excited energy state is resonant with a top portion of the well.

72. (Previously Added) A semiconductor as in claim 71, wherein said barrier layer is greater than 500 microns in width.

73. (Previously Added) A semiconductor as in claim 71, wherein said semiconductor image sensors have a peak which is within the infrared range.

74. (Canceled)

75. (Previously Added) A semiconductor as in claim 74, wherein said semiconductor image sensors have a reception peak which is substantially at 8.5 microns.

76. (Previously Added) A semiconductor as in claim 71, wherein said quantum well stacks each include at least 50 quantum well structures.

77. (Previously Added) A semiconductor as in claim 71, wherein said semiconductor image sensors are image sensors.

78. (Previously Added) A semiconductor as in claim 71, wherein each of said quantum well stacks is spatially aligned with each of said image sensors.

79. (Previously Added) A semiconductor as in claim 71, further comprising a radiation direction adjusting element that adjust a direction of input radiation relative to said quantum well stacks.

71. (Previously Amended) A semiconductor, comprising:

a plurality of semiconductor image sensors, arranged on a substrate in an array;

a plurality of quantum well stacks, respectively associated with said plurality of semiconductor image sensors, each said stack comprising a plurality of quantum well structures, each said quantum well structure having a barrier layer of a first semiconductor material that is greater than 300 microns in width, and a well layer of a second semiconductor material, said first and second semiconductor materials defining a band gap therebetween, each well layer of each quantum well structure coupled between two of said barrier layers, and each well layer having a well bottom and a well top, wherein each well supporting an unexcited energy state within said well, and a bound excited energy state for photo carriers, each of said well layers being selected such that the bound excited energy state is resonant with a top portion of the well.

72. (Previously Added) A semiconductor as in claim 71, wherein said barrier layer is greater than 500 microns in width.

73. (Previously Added) A semiconductor as in claim 71, wherein said semiconductor image sensors have a peak which is within the infrared range.

74. (Canceled)

75. (Previously Added) A semiconductor as in claim 74, wherein said semiconductor image sensors have a reception peak which is substantially at 8.5 microns.

76. (Previously Added) A semiconductor as in claim 71, wherein said quantum well stacks each include at least 50 quantum well structures.

77. (Previously Added) A semiconductor as in claim 71, wherein said semiconductor image sensors are image sensors.

78. (Previously Added) A semiconductor as in claim 71, wherein each of said quantum well stacks is spatially aligned with each of said image sensors.

79. (Previously Added) A semiconductor as in claim 71, further comprising a radiation direction adjusting element that adjust a direction of input radiation relative to said quantum well stacks.

80. (Previously Added) A semiconductor as in claim 79, wherein said radiation adjusting element includes a plurality of random reflectors.

81. (Previously Added) A semiconductor as in claim 80, wherein said random reflectors are formed of gold.

82. (Previously Added) A semiconductor as in claim 80, wherein said random reflectors are formed of silver.

83. (Previously Added) A semiconductor as in claim 71, wherein said quantum well structures are formed of GaAs, and said barrier layers are formed of $Al_xGa_{1-x}As$.

84-89. (Withdrawn)